

Nutrition In Pregnancy

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Introduction

Looking back in time it is not at all surprising that ancient scriptures of almost every religion prescribed do's and don'ts in pregnancy. Indeed as is revealed in Judges 13:2; the angel of the Lord appeared to the woman and said to her, "Behold you are barren and have no children, but you shall conceive and bear a son. Therefore beware, and drink no wine or strong drink and eat nothing unclean, for lo, you shall conceive and bear a son."

Historical perspective :- Before the 17th century diet therapy in pregnancy was based on the practical teachings of Hippocrates, Aristotle and Galen. William Smellie the famed British Obstetrician was one of the first to associate infantile rickets with pelvic deformities in adults (Smellie 1752). As an alternative to destructive operations James Lucas in 1788 sought 'temperance in diet, a diminution in quantity and a change in the quality of food, among other bizarre interventions induced to deliver a small baby (Spencer 1923). Every student of World history is aware of the terrible effects imposed on mankind by the 2nd World War. Amongst the mayhem which was obvious and recorded for posterity were the not so visible destructive effects on an entire future generation.

Antonov (Antonov 1942) indicated that during the 18 month period of starvation during the 1942 siege of

Leningrad during World War II the infant mortality rate doubled which included 9% of full term infants and 31% of Low birth weight infants. Smith (Smith 1947) found that Dutch Women who had severely restricted diets during 6 months of their pregnancies (< 1000 calories and 30-40 gms proteins/day) gave birth to infants 10% lighter in birth weight.

Counselling :- Nutrition counselling is serious business and cannot be dismissed by advocating a well balanced diet and a glass of milk and prescribing nutritional supplements. Each and every case needs to be dealt with on an individual basis and history taking should be detailed.

Factors affecting foetal growth :- Rather than provide a chart for nutrition requirement in pregnancy it would be correct to understand nutritional factors that may affect foetal growth from a period before conception itself. The variables that would come into play are maternal age, racial characteristics, a history of previous IUGR/SGA in pregnancy, preconception weight and the amount of weight gain during the current pregnancy. Each of these factors are not absolute and dietary requirements may have to be met with in individual cases according to individual needs.

Pregravid weight :- It is established quite clearly by now that checking pregravid weight (if the patient has this knowledge) and registering the patients weight at the first visit are of vital importance, and often remain neglected.

Indeed, the strongest predictors of infant birth weight after length of gestation are maternal pregravid weight and gestational weight gain (Luke B, 1980). Those women at either extreme, underweight or overweight before conception are at an increased risk for prematurity or low birth weight and other complications.

Underweight is defined as 10% or more below a standard or ideal weight for height, or a weight is 20% or

more above standard weight for height. Pregravid weight should be average for height or even higher to include a margin of safety for variations of weight during gestation (Nat. Academy of Sciences 1990).

Maternal Age:- As previously felt, poor nutrition may not be the cause of problems of prematurity, low birth weight or maternal morbidity in juvenile gravidas in the developed world anymore (Osofsky 1968, Stepto et al 1975), but may still be a factor in the developing countries and in places where an unmarried mother may not be looked kindly upon and concealment of an unwanted pregnancy for long may be resorted to. Socioeconomic factors in the third world may be a main cause of malnutrition in such cases.

Obstetric History:- History could repeat itself in cases of low birth weight and SGA deliveries in subsequent births (Bakketeig et al 1979). The risk of a second birth also being SGA was found to be 3.4%. The recurrence of foetal growth restriction could be nearly 50% (Visser et al 1986.) Stein and Susser (1984) suggest that the most widespread environmental cause of IUGR is probably not malnutrition. History taking should be detailed and all possible causes should be looked into and recurring causes identified and treated if possible.

Criteria for referral for nutrition counselling:-

I] Weight or growth problems:-

A] Infant

- 1] Previous low birth weight infant
- 2] Previous IUGR or SGA.

B] Mother

- 1] Overweight,
 - a] Pregravid obesity ($\geq 20\%$ above ideal weight for height,
 - b] Excessive weight gain (> 7 Pounds/month)
- 2] Underweight:-
 - a] Low pregravid weight ($\geq 10\%$ below ideal weight for height.
 - b] Inadequate weight gain (< 2 pounds/month after 1st trimester)

c] Excessive vomiting (sufficient to cause weight loss or ketonurea)

(II) Diet related anaemias :- A) Iron deficiency anaemia, B) Pica, C) Vegetarian diet

(III) Medical Problems :- A) Gestational diabetes, B) Lactose intolerance, C) Alcoholism, D) Drug use

If during the antenatal period nutrition related problems become serious enough, admission for monitoring and treatment may be required for which the guidelines may be as under:-

Guidelines for admission for maternal malnutrition (developed at the Columbia Prebyterian Med. Centre) :-

- 1) Weight loss of 10% or more of pregravid weight during the first trimester.
- 2) Inadequate weight gain (< 10 lbs) by 30 weeks gestation.
- 3) Hyperemesis gravidarum as defined by any two of the following criteria: -
 - a) Inability to retain any solid or liquid food,
 - b) Abnormal electrolytes (especially chlorides), acidosis,
 - c) Acetoneurea,
 - d) Weight loss, no gain by 12 weeks gestation or later,
 - e) Failure of drug therapy.
- 4) Discrepancy between size and dates of 2 weeks or more at 20 weeks gestation or later with weight loss or failure to gain.

Stages of Pregnancy and Nutritional Requirements :-

It is of great importance that prepregnancy nutrition counselling includes imparting knowledge to the patient that each stage of pregnancy has its own unique

nutritional requirements. Nutritional requirement may vary at each stage. The blastogenic phase, where there is an exponential increase in the number of nuclei and DNA would need an appropriate supplementation of amino acids, arginine and lysine. Reduced metabolic growth may occur when a low protein diet is consumed. Abortions and nidation problems may result. Future placental functions could be adversely affected.

In the embryonic stage during the third through eighth post ovulatory weeks, quality reigns rather than quantity. Malformations may occur in cases of zinc or folate deficiencies.

Nutritional deficiency in the fetal stage may lead to growth impairment and functional changes.

Weight gain during pregnancy :- As recommended in the National Academy of Sciences 1990. (Nat. Academy of Sciences 1990) report, caloric intake should be based on the pregnant woman's pregravid weight and the last rate of weight gain to achieve the optimal total gestational weight gain.

For those women with an optimal weight range for height, a good total gestational gain would be 25-35 lbs. The rate should be 3-5 lbs in the first trimester and about 1 lb per week for the 2nd and 3rd trimester.

Women who are overweight (20% or more over ideal weight) when they begin pregnancy, should have a total weight gain at 15-25 lbs at a rate of 2 lbs in the 1st trimester and 2/3rd of a lb per week in the second and third trimester. For women who begin pregnancy underweight (10% or more under ideal) the total gain should be 28-40 lbs depending on the severity of their pregravid deficit.

In such women it is postulated that additional nutrients can only benefit the foetus after preliminary correction of the mother's own weight (Luke et al 1984; Luke et al 1981). Such a woman should gain 5 lbs in the first trimester and slightly more than 1 lb/wk during the 2nd and 3rd trimester.

Dietary Recommendations: - The required daily allowance (RDA) of various nutrients provide the most

current standards for the prescribing of a balanced diet in pregnancy. An analysis of the RDA prescribed shows that in most data the requirements of iron, folic acid and vitamin D increase by over 100%, whereas other nutrients such as Ca, phosphorus, Thiamine and Vitamin B increase by 33 to 50%. Requirements for protein, zinc and riboflavin increase by 20 to 25% and those for energy, Mg, I₂, Niacin and Vit.A, B₁₂ and C increase by 17% or less. An additional 300 kcal/day is required. The total dietary intake recommended for a healthy adult pregnant woman is 2400 kcal/day.

Prescriptions of nutrients during pregnancy: -

It is also common practice to prescribe formulations containing iron, calcium, folic acid, Vit D and other trace elements like zinc, Mg, chromium etc. One would caution against overdosage as megadoses of nutrients could prove harmful during pregnancy. Fat soluble vitamins A and D are the most potentially toxic during pregnancy. Pediatric and obstetric literature reports kidney malformations, aortic stenosis and infantile hypercalcemia in children whose mothers took between 40,000 to 50,000 I.U. of Vit A (Bernhardt & Dorsey 1974; Pilotti 1975; Dalderup et al 1965, Dalderup 1968, Seelig 1969) during gestation.

Large doses of Vit. C during pregnancy might predispose to infantile scurvy. (Cochrane 1965; Bean 1978).

Role of Milk as a Nutrient: - (Is Yoghurt a replacement) : -

The role of milk as a nutrient in pregnancy is being questioned in many quarters. It is consumed as a provider of calcium as a nutrient. However, a majority of the world's adult population is unable to digest varying quantities of milk due to low levels of the enzyme lactase (Bayless 1971, McCracken 1971, Simoons 1972).

Therefore, lactose the main disaccharide in milk remains unutilized and is not available for the absorption of animal proteins and for enhancing the digestibility and utilisation of vegetable proteins (Sewell 1965).

It would probably be of help to include ample

amounts of low lactose, high calcium food in diets of lactose intolerant adults such as yogurt and cheeses or specially treated milk.

Fortified foods: - Food enriched with nutrients are available now in the form of fortified food. In this manner nutrients are made available in daily and common dietary requirements. Bread is often fortified with iron and Vit. B, Salt with iodine, milk with Vit. A and D and cereals with iron and Vit. B. In this manner it is not difficult to provide a balanced diet where such food is provided to a pregnant woman.

Future role of Nutrients: - With advancing technology and improvement in neonatal care, it is a possibility that new millennium technology may see a lowering of the age of viability. It would then be absolutely important that the nutritional demands upto that stage are met with in order to have a positive impact on the prognosis of low birth weight fetuses.

Conclusion: - The ethos of nutrition in pregnancy lies in the realization that each individual has unique needs during pregnancy. Nutritional requirements vary from individual to individual and terms like the required daily amount may not be applicable universally.

Each stage of pregnancy has special requirements which must be met. Counselling must set standards that are to be met with, so that rectification can be attempted when they fall short.

Appropriate weight gain, proper supplementation when necessary and avoiding overdosage may be the mechanisms to reach the goal of a healthy infant born to a healthy mother.

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